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NDIA Fuzing Conference

San Antonio, Texas

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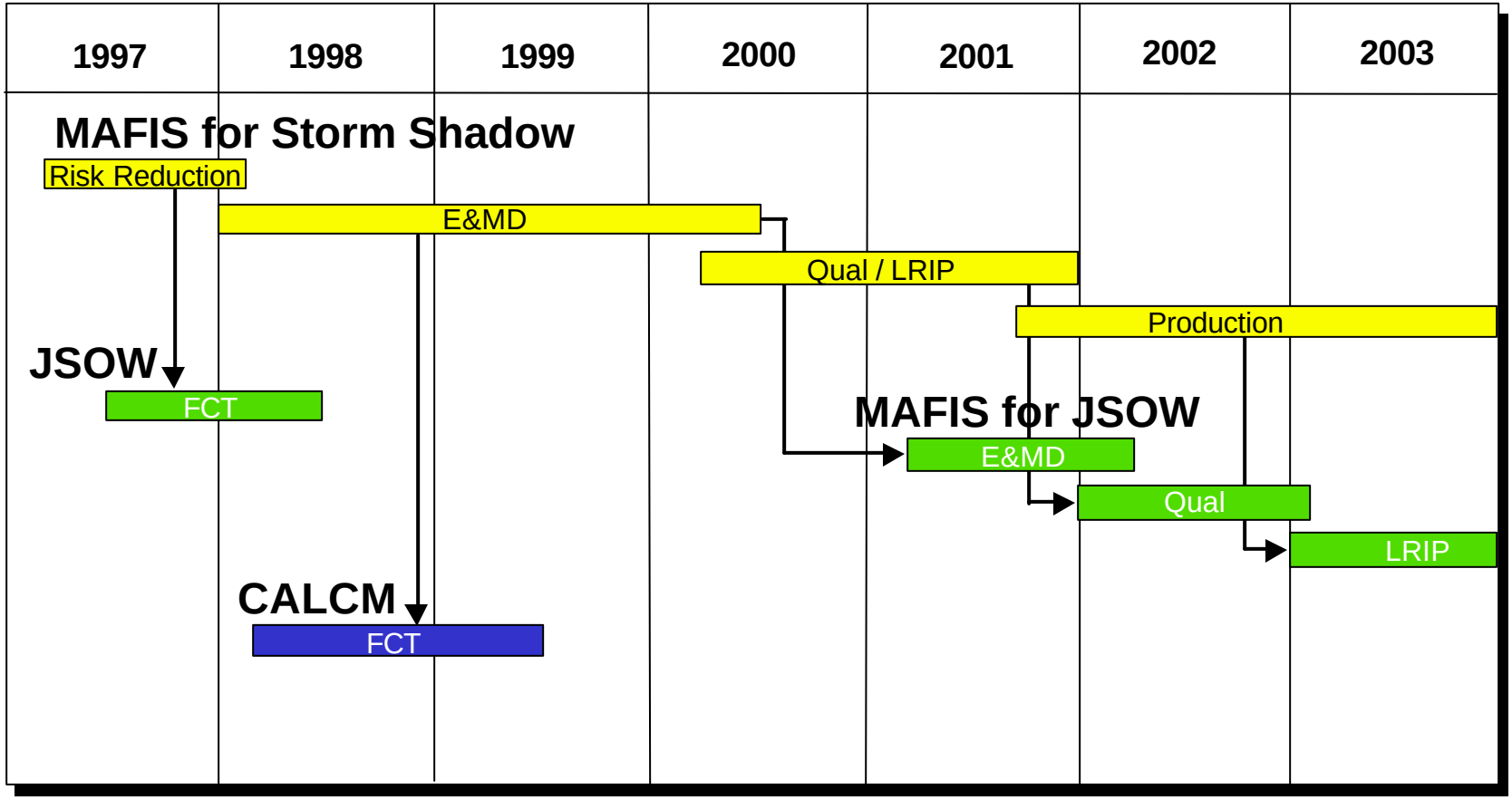
Thales Missile Electronics Fuzing Pedigree

- TME is a fuzing Company - that's what we do
  - Building hardened fuzes since 1914
  - Fuzed "Dambuster" Bouncing Bomb - 1944
  - World's first hardened and electronic multifunction bomb fuze (MFBF) - 1981
    - 27,500 MFBF built
    - Successful FCT trial at Eglin - 1992
    - Used by RAF, RSAF and USAF in Desert Storm
    - Kosovo data indicates >99% reliability for MFBF in 400+ releases
  - Pioneer in modern fuze hardened electronics
    - Providing, through ATK, "smart electronics" for USAF Hard Target Smart Fuze (HTSF) and Multi Event Hard Target Fuze MEHTF)
  - MAFIS selected for Storm Shadow in 1997 - development and production
    - Now commitments from 4 non-US countries - 4000+ fuzes

Multi-Application Fuze Initiation System (MAFIS)

- MAFIS - Family of Fuze Solutions
- Modular, 3”, Out-of-Line fuze
- High Shock survivable
- High Reliability
- Programmable
- MAFIS - company funded 95-98
- JSOW FCT - 96-98
- CALCM FCT 97-99
- Storm Shadow 97- current Production
- JSOW E&MD 2001 - current

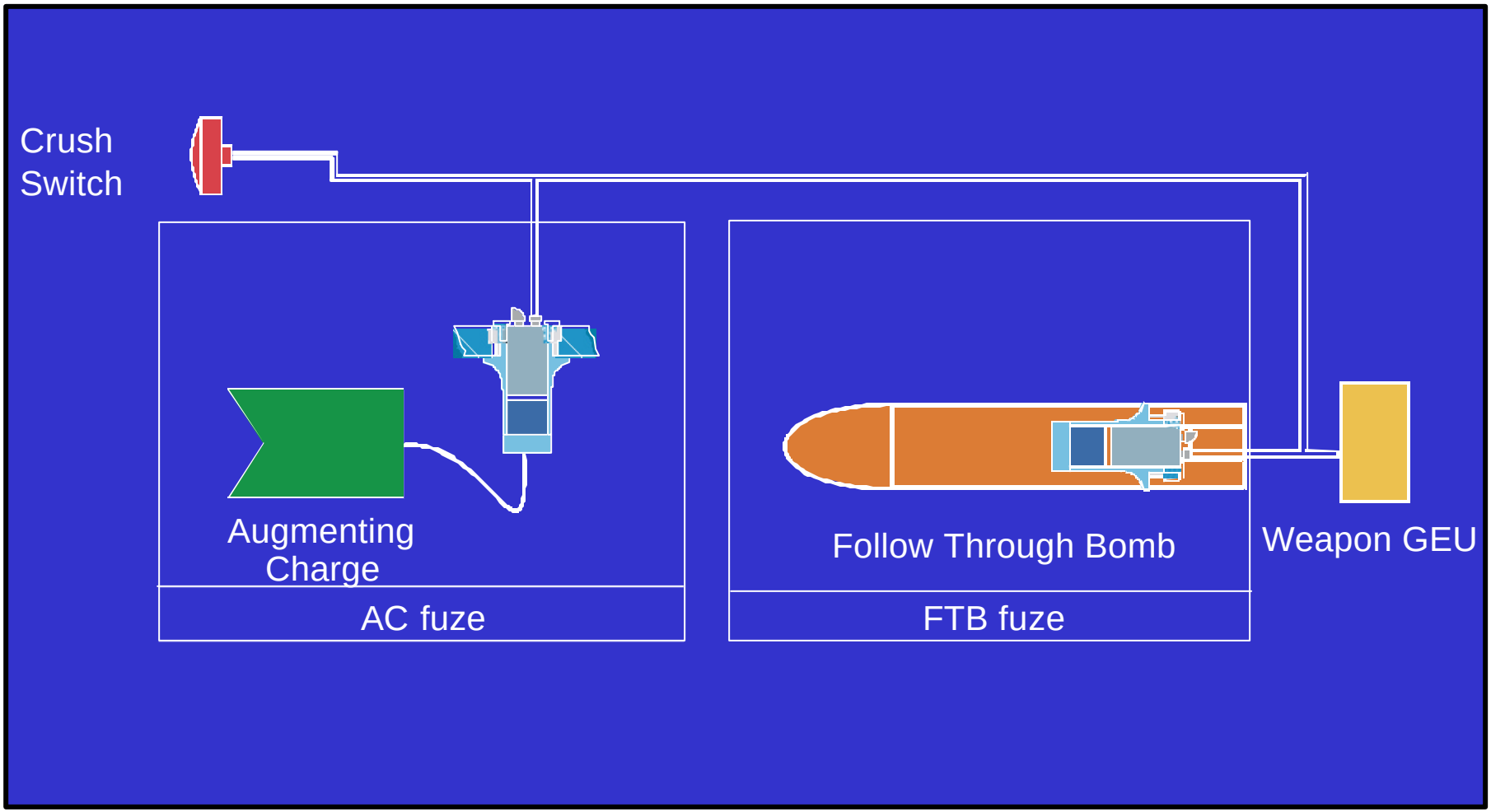
MAFIS Program Links



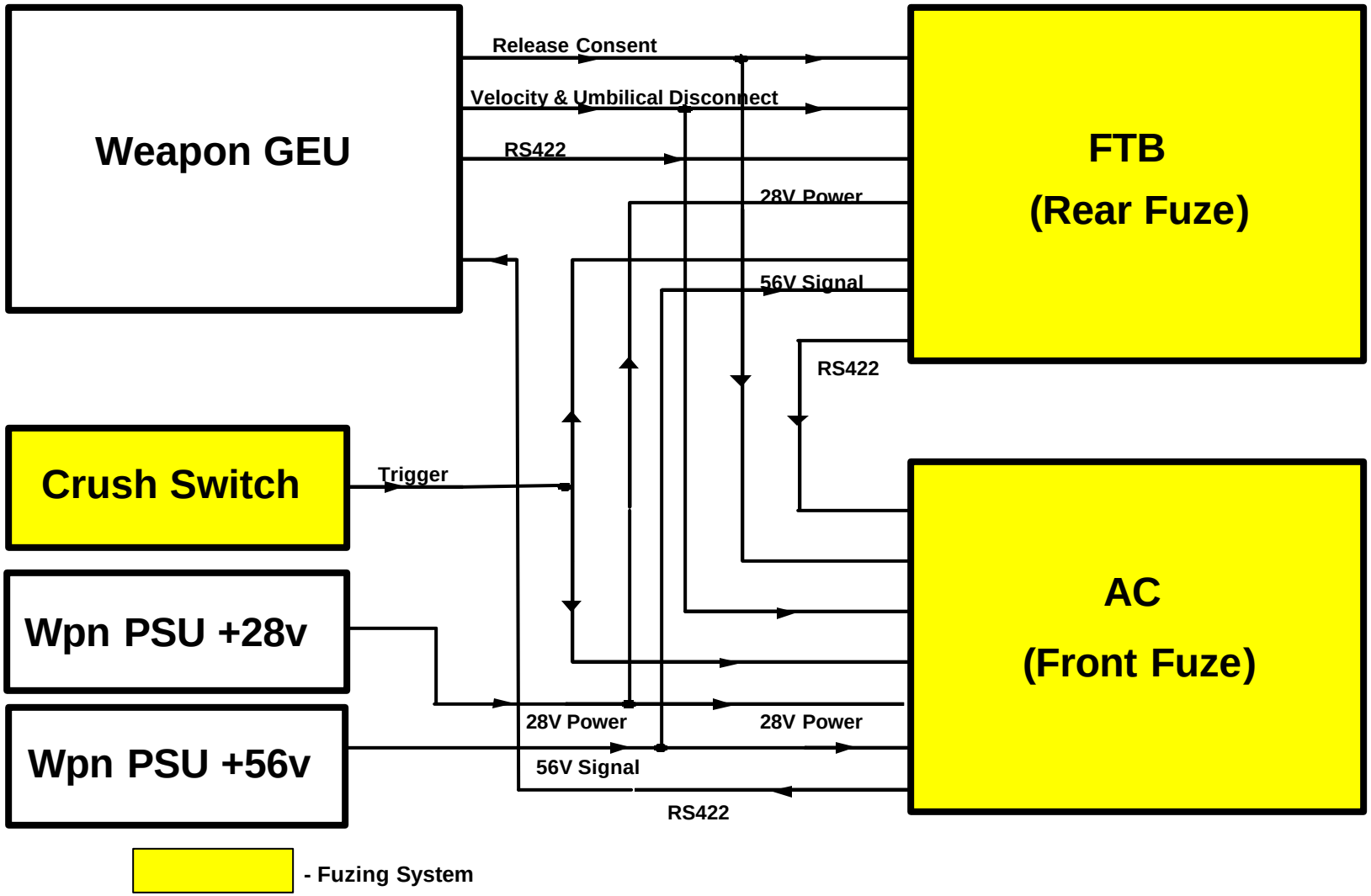
MAFIS Key Parameters

- Out-of-Line System/Barrel Rotary Shutter/Two Detents
- Independent Safety Inputs
- Dual Safety Timers/Crystal and RC Oscillator
- Programmable - RS422 Communications
- Independent Arming and Processing Power
- 256 Post Impact Firing Delays - 1 ms Resolution
- High “g” Survivable - 30,000g Longitudinal & Lateral
- High Reliability (0.992- Per Fuze)
- Compliant with STANAG 4187 Design Safety Principles
- Insensitive Munitions Capability (STANAG 4439)

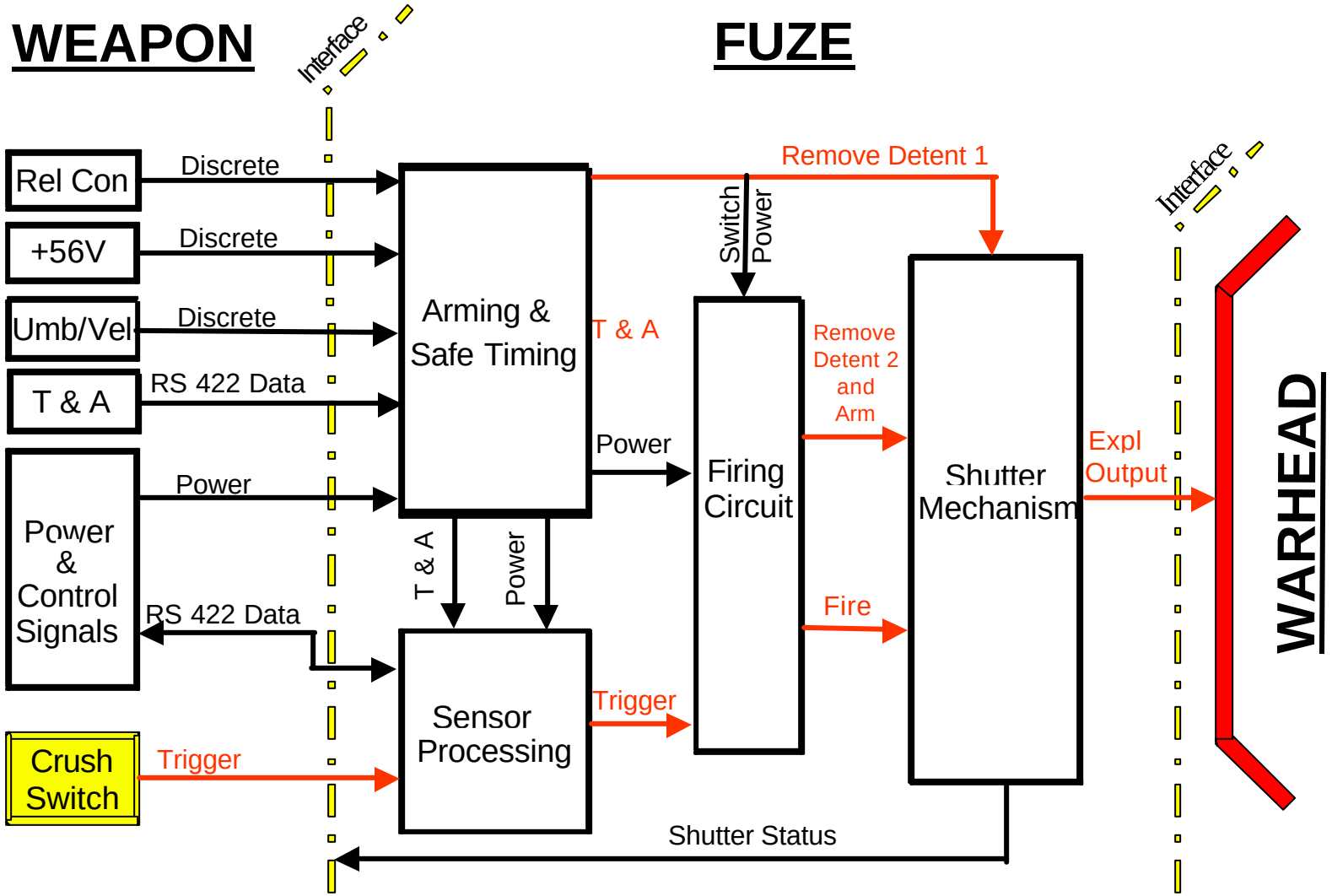
JSOW System Schematic



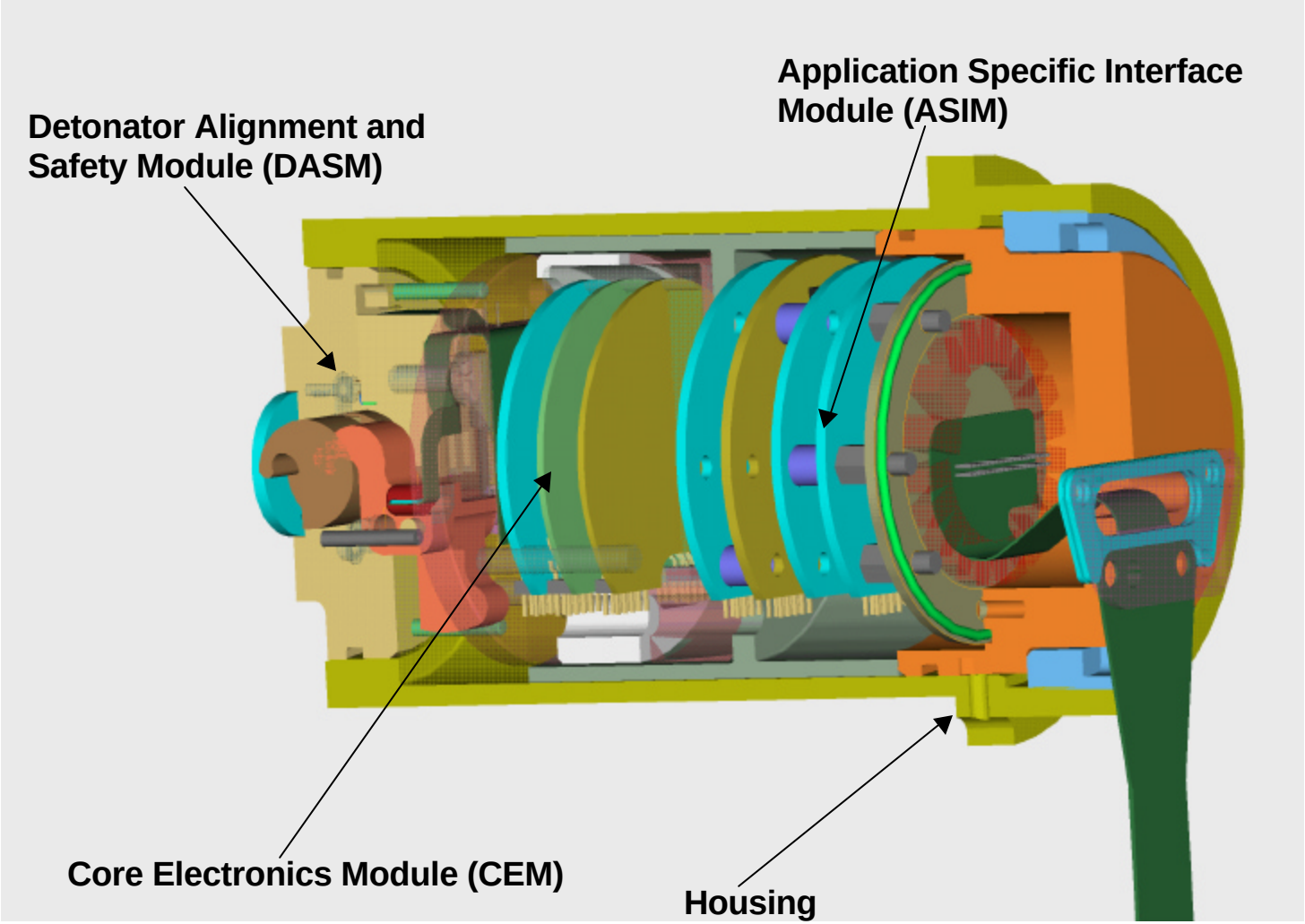
JSOW Fuzing System Block Diagram



JSOW Fuze Functional Diagram



JSOW Fuze Assembly



JSOW Fuze Assembly

JSOW / Storm Shadow Build Standard Variation

- Key Changes
  - Different Environmental and Safety Inputs
  - Release Consent
    - Pressure vs. +56v Signal
    - No input vs. Velocity and Umbilical
    - +28v Signal vs. T&A Command
  - Different RS 422 Communications
  - Environmental Qualification Conditions
  - Standoff Sensor vs. Crush Switch

JSOW / Storm Shadow Build Standard Similarity

Requirement	How Satisfied
Core Performance	By Similarity
ASIM Performance	Functional Testing
Explosive Train Safety and Performance	By Similarity
Temperature	+ 72 to -45°C
Vibration	Testing
Shock	Testing
Longitudinal Acceleration	Testing
Other Environments	Test and By Similarity
Insensitive Munitions	Similarity, FCT, AUR Tests

Summary

- Modular Fuze Design
- Adaptable for a variety of Different Weapon Systems
- Design Maturity of Common Modules
- MAFIS for JSOW
  - Engineering Development Programme
- Future Growth Capability
  - Intelligent Fuzing/Voids/Depth Measurement
  - EFI/Master-Slave Configuration